

# Sovereign Hill Education

## Simple Machines Complex Machines

### Useful Tools on the Goldfields

*It is recommended that this be completed in conjunction with our Model Making Education Session*

### Pre-excursion Activity 1: Dating

Your teacher will give you some inventions and some dates. See if you can match the invention to the year or period it was invented. Paste it in order in the table above.

[illegible]

[illegible]

## Excursion Activity 1 - Trail 1


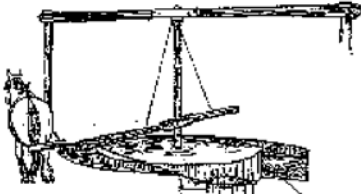
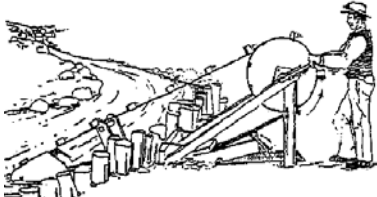
### Mastering Machines

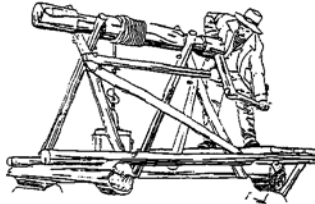
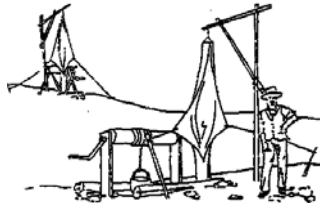


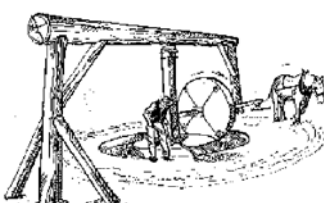

- 1 Each description below explains the role of one machine on the diggings. Find the machines and see if you can match it to its description. Fill in the simple machines used and the job it's doing, as you go.

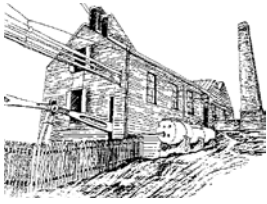
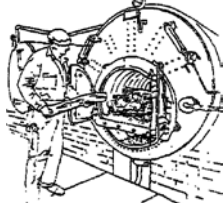
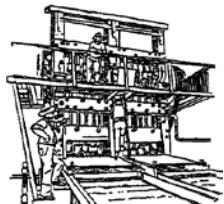
- A Used to pump water from underground works
- B Brings fresh air into the shaft
- C Lifts water from the creek to a puddling machine
- D Supports wheels that carry cages that are raised and lowered in the shaft
- E Crushes small amounts of quartz to free the gold
- F Hauls buckets from a shaft
- G Crushes large amounts of quartz to free gold
- H Horse –drawn, used to haul large buckets up and down deep shafts
- I Transports water from a higher place to a lower place
- J Makes steam to power pump
- K Used to break up clay to free quartz and gold
- L Used to sift gravel to find gold

- 2 Use these symbols to fill in the types of simple machines:

P= pulley    W= wheel    G= gear    L= lever    WA = wheel & axle

Machine Name	Description Letter	Simple Machine	The job it makes easier
The Whim 			
Puddling machine 			
Californian Pump 			

Machine Name	Description Letter	Simple Machine	The job it makes easier
Windlass 			
Windsail 			
Cradle 			
Flume 			
Chilean Mill 			
Poppet Head 			

Machine Name		Description Letter	Simple Machine	The job it makes easier
Cornish Beam Pump				
Engine & Boiler				
Battery				

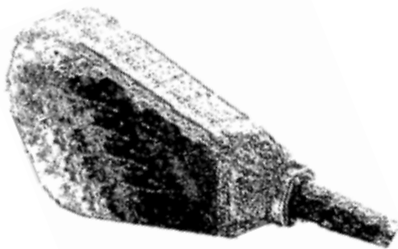
## Excursion Activity 2 - Trail 2

### Businesses of the Goldfields

Match the following machines to their business, finding out why each is important to that business.

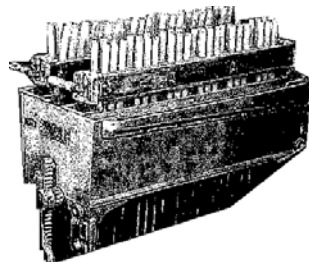
Label any simple machines.

**A**



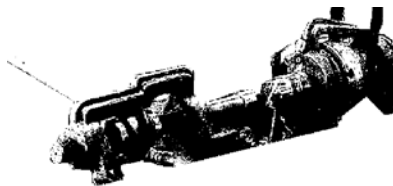
Wheelwright (42)

**B**



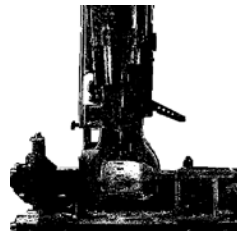
Foundry (37)

**C**



Blacksmith (9)

**D**



Candle Works (40)

### Reasons for importance

**A**

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**B**

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**C**

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**D**

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### Excursion Activity 3

**Business Detail** (*Battery, Engine and Pump, Foundry, Gold Pour, Wheelwright or Furniture Works*)

For one business answer the following.

- 1 What is the name of your business?  
.....
- 2 What does your business produce?  
.....  
.....
- 3 Why is this useful to society?  
.....  
.....
- 4 List 3 tools used by this business and their use.  
a .....  
b .....  
c .....
- 5 Draw a labelled diagram of the machinery used.  
Include all pulleys, levers and gears, showing clearly  
how each connects to the next. Ensure you include  
the source of energy (eg. steam).
- 6 Give a step by step explanation of how your machine  
works, including why each simple machine is  
necessary. Think about the direction, the speed  
and effort for each simple machine and refer to  
your diagram.  
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.....  
.....  
.....  
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**7a** Are there any other processes at the time that  
could do the same job?

If Yes i) What were they?  
.....

ii) Why is this machine being used rather than others?  
.....  
.....

If No i) Why was this the only available process?  
.....

ii) Are there any modern processes that do this job?  
.....  
.....

**8** Give 3 good points and 3 bad points about this machine.

**Good**

1 .....

2 .....

3 .....

**Bad**

1 .....

2 .....

3 .....

**9** Machines work well in theory, but often have problems  
when running. Explain some of the problems that  
would occur with your machine and how they have  
been overcome. Refer to things like friction, pressure,  
and wear.

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## Post-excursions Activity 1

### Machines on the diggings: reflection

1 Why did some of the machines do the same job?

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2 Which simple machines were the most common?  
Explain why you think they were used so much.

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3 Give one example or drawing of where you found  
each of the following simple machines:

**a** Wheels

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**b** Pulleys

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**c** Gears

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**d** Levers

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**e** Inclined planes

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4 What were the difference sources of energy used  
to power all of the machines?

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## Think and Apply

5 Where did they get all of the materials to make  
the machines?

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6 Why did they go from simple machines to more  
complex machines?

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7 What types of simple machine do you use during  
the day to get basic tasks done?

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## Post-excursions Activity 2

### Golden Machines

Work out the phrase below. Each letter has a number in its place.

A	B	C	D	E	F	G	H	I	J	K	L	M
				10							22	11

N	O	P	Q	R	S	T	U	V	W	X	Y	Z

E M E E L E E E L  
 16 8 12 10 22 4 11 6 25 10 15 19 19 16 15 6 21 10 13 8 22 24 17 8 7 25 10 10 24 10 24 16 8 12 18 20 10 18 22 8 16

M L E M E L E L L E , L E E , E  
 8 5 19 6 11 4 22 10 11 18 26 12 6 25 10 19 22 6 21 10 4 7 22 22 10 17 19 22 10 20 10 15 19 18 25 24 13 10 18 15 19

**Unscramble each of the clue words.** Take the letters that appear in   boxes and unscramble them for the final message. *Extra: Which one in the list is NOT a simple machine?*

LYELUP	<span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
GERA	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
HEEWL	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span>
MPRA	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
VERLE	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
LOVSEH	<span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
NAP	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
PIKC	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
RWROHLEBWAE	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
DIANSLSW	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
DLIWNASI	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
FULEM	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
TTRABEY	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>
RNCAALIFNOI MUPP	<span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="background-color: yellow; border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>

